Remarks

Now pending in the application are claims 1-16 and 18-42, of which claims 1, 8, 9, 10, 16, 24, 26, 30, 34 and 35 are independent. The following comments address all stated grounds for rejection, and the Applicant respectfully submits that the presently pending claims, as identified above, are now in a condition for allowance.

Rejections of Claims 1-42 under 35 U.S.C. § 102

Claims 1-42 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,901,579 ("Suguta"). Applicant respectfully traverses the rejection for the following reasons.

Claims 1-9, 36-38 and 42

Independent claims 1, 8 and 9 are directed to a computer implemented method, a computer program product, and a processor and memory, respectively, that identify portions of a model as being critical to a real-time execution of the model, and other portions as being non-critical to a real-time execution of the model. The claimed invention generates code that is capable of real-time execution based on the critical portions of the model. Claims 2-7, 36-38 and 42 depend on claim 1.

In an illustrative embodiment described in the specification with reference to Fig. 3, for example, the automatic code generation process (82) may determine whether a section of the block diagram model (50) is critical or non-critical to a real-time execution of the model (step 84). The non-critical portions may be post-processing units (PPU) of the model that have no data outputs that feed non-post-processing sections of the model, as recited in claims 2 and 3. If the section is marked as a PPU, no code is generated (step 86). If the section is not marked as a PPU, code is generated (step 88). The generated code may be executed on a target processor (32) and the output of the code may be received by and processed in the non-critical portions of the model, which may be executed in a host computer (12).

Applicant respectfully submits that Suguta does not disclose *identifying portions of a model as being critical to a real-time execution of the model and other portions as being non-*

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critical to a real-time execution of the model, and *generating code that is capable of real-time execution based on the critical portions of the model,* as recited in claims 1, 8 and 9.

The Office Action states that Suguta discloses these features of the claimed invention at Column 1, lines 11-17 and Column 2, lines 40-51. See the Office Action, page 6, line 12 through page 7 line 4. Applicant respectfully disagrees.

Suguta generates an object-oriented language program from a class definition. Suguta discloses generating an object-oriented program from generation pattern descriptions with the structure information extracted from the class definitions. See Suguta, Column 2, lines 52-61. Suguta is provided to verify whether or not the generated program includes a definition which conflicts with an existing program immediately after the generation of the program, without waiting for the compiling of the generated program. See Suguta, Abstract.

The Examiner asserts in the Office Action that the code generation of the claimed invention "is realized as automatic generation of a copy constructor in an objected oriented programming language program," as disclosed in Suguta. See the Office Action, page 6, lines 20-21. Although Suguta discloses automatic generation of an objected oriented language program, Suguta does not disclose generation of code for a model that is capable of real-time execution based on the critical portions of the model, as recited in the claimed invention. In the claimed invention, code for a model is generated using the portions of the model that are critical to the real time execution of the model.

In the Office Action, the Examiner asserts that "[s]ince Suguta allows automatic generation of source code, generation of code that is capable of real-time execution is realized." See the Office Action, page 7, lines 2-3. Applicant respectfully disagrees with the Examiner's assertion that Suguta discloses the generation of code that is capable of real-time execution. Although Suguta discloses automatic generation of code, Suguta does not disclose generation of code that is capable of real-time execution. Indeed, there is no mention of the term "real-time execution" or any other related terminology in Suguta, because Suguta is entirely unconcerned with code execution.

Furthermore, Suguta does not disclose identifying portions of a model as being critical or non-critical to a real-time execution of the program. Suguta merely discloses the generation of an object oriented language program using information on the internal structure of an input class definitions and the generation pattern descriptions. Suguta generates an entirely new program, and the only analysis done to the existing program code relates to extracting its structure from class definitions supplied by a user. See Suguta, Column 2, lines 58-61. Suguta does not disclose analyzing the existing program to determine which portions are critical or non-critical to real-time execution of the program. Suguta does not disclose identifying components of a model related to a real-time execution of the model. Nor does Suguta disclose generating code based on the components of a model that are critical to the real-time execution of the model, as recited in the claimed invention.

In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to disclose each and every element of independent claims 1, 8 and 9. Applicant therefore requests the Examiner to reconsider and withdraw the rejection of claims 1-9, 36-38 and 42 under 35 U.S.C. §102(e), and pass the claims to allowance.

Claims 10-15, 26-29 and 39

Independent claims 10 and 26 are directed to a computer implemented method and a computer program product, respectively, that specify a model including a first subset of sections designated as post processing unit sections, and a second subset of sections designated as core processing unit sections. The claimed invention generates code for the model using the second subset of sections. Claims 11-15 and 39 depend upon claim 10, and claims 27-29 depend on claim 26.

In the illustrative embodiment described in the specification with reference to Fig. 3, the code generation process (42) specifies a block diagram model that includes post processing unit sections and core processing unit sections (step 80). Once the block diagram model is specified, the automatic code generation process (82) determines whether a section of the block diagram model is a post processing unit (PPU). The post processing unit sections may be logical units of the model that have no data outputs that feed core processing unit sections, as recited in claim 11.

If the section is marked as a PPU no code is generated (step 86). If the section is not marked as a
PPU, code is generated 86 (step 88).

Applicant respectfully submits that Suguta does not disclose *specifying a model that
includes a first subset of sections designated post processing unit sections and a second subset of
sections designated as core processing unit sections*, and *generating code for the model using
the second subset of sections*, as recited in claims 10 and 26.

The Examiner asserts in the Office Action that these features of the claimed invention are
anticipated by Suguta because "Suguta discloses the aspect of generating software code," as
described above. See the Office Action, page 7, lines 6-11. Applicant respectfully disagrees.

Although Suguta discloses the generation of an object oriented language program using
information on the internal structure of an input class definition and the generation pattern
descriptions, Suguta does not disclose specifying a model that includes post processing unit
sections and core processing unit sections. Furthermore, Suguta does not generate code for a
model using the core processing unit sections of the model.

Additionally, Applicant submits that Suguta does not disclose the step of *linking the code
to the first subset of sections (post processing unit sections) through an inter-process
communication link*, as recited in dependent claim 13. In an illustrative embodiment, the
generated code may be executed on a target processor (32) and the output of the code may be
received by the post processing unit sections, which may be executed in a host computer (12), in
order to process the output in the post processing unit sections.

The Office Action states that Suguta discloses this limitation in Fig. 3 and Column 6,
lines 30-38. See the Office Action, page 7, lines 12-14. Applicant respectfully disagrees.
Suguta discloses in Fig. 3 an apparatus for the automatic generation of an object-oriented
program. The apparatus, however, does not include an inter-process communication link. In Fig.
4, Suguta discloses an input/output unit (9) connected to a computer system (8). See Suguta,
Column 6, lines 30-38. This connection is not an inter-process communication link of the
claimed invention. Since the system (8) disclosed in Suguta is not a multi-process system,

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Suguta does not need to discuss an inter-process communication link. Therefore, Suguta does not disclose an inter-process communication link that links the code to the first subset of sections, as recited in the claimed invention.

In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to disclose each and every element of independent claims 10 and 26. Applicant therefore requests the Examiner to reconsider and withdraw the rejections of claims 10-15, 26-29 and 39 under 35 U.S.C. §102(e), and pass the claims to allowance.

Claims 16-23 and 40-41

Independent claim 16 is directed to a system including a graphical user interface (GUI). The GUI is adapted to receive user inputs to specify components of a model in one of a first subset of sections designated as post-processing elements of a model and a second subset of sections designated as core elements of the model. The system also includes an automatic code generator for generating code capable of real-time execution based on the second subset of sections. Claims 18-23 and 40-41 depend on claim 16.

Applicant respectfully submits that Suguta does not disclose *a GUI that is adapted to receive user inputs to specify components of a model in one of a first subset of sections designated as post-processing elements of a model and a second subset of sections designated as core elements of the model*, as recited in claim 16.

Suguta discloses in Fig. 4 an automatic object-oriented program generation apparatus including an input/output unit (9). Suguta also discloses that a user (a programmer) can give an instruction such as a class definition (11) or a generation pattern description (41) to the computer system so that a program is generated. *Suguta, however, does not disclose a graphical user interface that enables a user to specify which components of a model are post-processing elements or core elements of the model.* It appears that a user or programmer cannot specify which components of a model are post-processing elements or core elements using the input/output unit (9) of the Suguta reference.

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Additionally, Applicant submits that Suguta does not disclose *an automatic code generator for generating code capable of real-time execution based on the second subset of sections*, as recited in claim 16.

Suguta discloses generating an object oriented language program using information on the internal structure of an input class definitions and the generation pattern descriptions. Suguta, however, does not disclose the generation of a program that is capable of real-time execution based on the core elements of the model. Although Suguta discloses the generation of a program, Suguta does not disclose that the generated code is capable of "real-time" execution. Suguta does not discuss the execution of the program.

In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to disclose each and every element of independent claim 16. Applicant therefore requests the Examiner to reconsider and withdraw the rejections of claims 16-23 and 40-41 under 35 U.S.C. §102(e), and pass the claims to allowance.

Claims 24-29, 34, 35

Independent claims 24, 34 and 35 are directed to a method, a computer program product, and a processor and memory, respectively, that receive a user input through a graphical user interface (GUI) specifying a block diagram model, the block diagram model including sections, a first subset of sections designated post-processing unit sections and a second subset of the sections designated as core processing unit sections. The claimed invention generates software source code for the block diagram model with a code generator using the second subset. The software source code is connected to the first subset via an inter-process communication link, and compiled into executable code. Claims 25-29 depend on claim 24.

Applicant respectfully submits that Suguta does not disclose *receiving user input through a graphical user interface (GUI) specifying a block diagram model, and the step of generating software source code for the block diagram model with a code generator using the second subset*, as recited in claims 24, 34 and 35.

Suguta discloses the generation of an object oriented program from a class definition. Suguta, however, does not specify a block diagram model, and generate software source code for the block diagram model. Suguta does not disclose anything about generation of code for a block diagram model.

Additionally, Applicant respectfully submits that Suguta does not disclose the step of *connecting the software source code to the first subset via an inter-process communication link*, as recited in claims 24, 34 and 35. Suguta does not disclose an inter-process communication link that connects the software code, which is generated using a second subset of sections designated as core processing unit sections, to the first subset of sections designated post-processing unit sections. Since the system disclosed in Suguta is not a multi-process system, Suguta does not need to disclose an inter-process communication link.

In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to disclose each and every element of independent claims 24, 34, and 35. Applicant therefore requests the Examiner to reconsider and withdraw the rejections of claims 24-29, 34 and 35 under 35 U.S.C. §102(e), and pass the claims to allowance.

Claims 30-33

Independent claim 30 is directed to a processor and memory configured to specify a block diagram model that includes data having internal pre-defined data storage classes and external custom data storage classes. Software source code is generated for the block diagram model with a code generator using the internal predefined data storage classes and the external custom data storage classes.

Applicant respectfully submits that Suguta does not disclose the steps of *specifying a block diagram model, and generating software source code for the block diagram model*, as recited in claim 30. Suguta discloses the generation of an object oriented program from a class definition. Suguta, however, does not disclose specifying a block diagram model, and generating software source code for the block diagram model. Suguta does not disclose anything about a block diagram model.

In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to disclose each and every element of independent claim 30. Applicant therefore requests the Examiner to reconsider and withdraw the rejections of claims 30-33 under 35 U.S.C. §102(e), and pass the claims to allowance.

Rejection of Claim 16 under 35 U.S.C. §103

Claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over Suguta. Applicant respectfully traverses the rejection for the following reasons.

Claims 16 is directed to a system including a graphical user interface (GUI). The GUI is adapted to receive user inputs to specify components of a model in one of a first subset of sections designated as post-processing elements of a model and a second subset of sections designated as core elements of the model. The system also includes an automatic code generator to generate code capable of real-time execution based on the second subset of sections.

Applicant respectfully submits that Suguta does not teach or suggest *a GUI that is adapted to receive user inputs to specify components of a model in one of a first subset of sections designated as post-processing elements of a model and a second subset of sections designated as core elements of the model*, as recited in claim 16.

In Fig. 4, Suguta teaches an input/output unit (9) for a user (a programmer) to input an instruction, such as a class definition (11) or a generation pattern description (41), to the computer system. Suguta, however, does not teach a graphical user interface that enables a user to specify which components of a model are post-processing elements or core elements of the model. The GUI of the claimed invention is different than the user interface of the Suguta reference, which is adapted to receive a class definition (11) or a generation pattern description (41).

The Examiner asserts in the Office Action that the limitations describing the GUI of the claimed invention is non-functional descriptive material and do not alter how the GUI is adapted

to receive user inputs to specify components of model. See the Office Action, page 6, lines 4-6. Applicant respectfully disagrees.

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." The functional descriptive material consists of data structures and computer programs which impart functionality when employed as a computer component. The nonfunctional descriptive material includes literary works and a compilation or mere arrangement of data. When nonfunctional descriptive material is recorded on some computer-readable medium, no requisite functionality is present to satisfy the practical application requirement. See MPEP §2106.

Applicant submits that the limitation describing the GUI of the claimed invention is functional and must be considered in determining the scope of the claimed invention. In the claimed invention, the GUI is adapted to receive user inputs to specify components of a model in one of a first subset of sections designated as post-processing elements of a model and a second subset of sections designated as core elements of the model. By specifying the post-processing elements and core elements of a model, the code generator generates code for the model that is capable of real-time execution in the claimed invention.

The limitation describing the GUI of the claimed invention is functional because the GUI imparts functionality when employed as a computer component. Depending on the user inputs received in the GUI, the model has the different structure of components, which causes the code generator to generator different code. In light of this, Applicant requests that the Examiner consider the limitations describing the GUI of the claimed invention.

Additionally, Applicant respectfully submits that Suguta does not teach or suggest *an automatic code generator generating code capable of real-time execution based on the second subset of sections*, as recited in claim 16.

Suguta teaches the generation of an object oriented language program using information on the internal structure of an input class definitions. Suguta, however, does not teach or suggest the generation of code capable of real-time execution. Although Suguta teaches the generation

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of a program, Suguta does not teach or suggest that the program is capable of "real-time" execution. Suguta does not teach or suggest anything about the execution of the program.
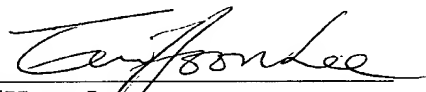
In light of the aforementioned arguments, Applicant respectfully submits that Suguta fails to teach all of the limitations of claim 16. Applicant therefore requests the Examiner withdraw the rejections of claim 16 under 35 U.S.C. §103(a), and pass the claims to allowance.

Conclusion

In view of the above, each of the presently pending claims in this application is believed to be in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue. If, however, the Examiner considers that further obstacles to allowance of these claims persist, we invite a telephone call to Applicant's representative.

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